

BULLETIN

OF THE INSTITUTE OF METALS

VOLUME 5

JANUARY 1961

PART 17

NEW YEAR MESSAGE FROM THE PRESIDENT

When Council invited me to be President of this Institute, I was deeply conscious of the honour of being allowed to serve the Institute in this capacity for a year. I was doubly appreciative of this privilege, because for one thing I belong to the unlearned section of the membership, and for another because Council recognized that, owing to frequent absences abroad, I would not be able to play as full a part in the Institute's affairs as I should wish.

In this New Year's message to all members of the Institute, I should like to say first how much I have appreciated the wholehearted co-operation of Council and members during my year of office. Secondly, I should like to express my regrets at my inability to attend the meetings of Local Sections.

In the third place I wish to assure members that the prestige and future role of the Institute are constantly engaging my attention and that of Council. I distinguish in my mind between the role of the Institute as an instrument of service to its members; and the role of its members as scientists and technologists in the service of the non-ferrous metal industries. This distinction is important in any reassessment of the future role of the Institute, and such reassessment is one which we must constantly examine in a changing world.

Lastly, I take this opportunity to wish all members a happy and prosperous New Year. I hope to see many of you at our Spring Meeting, when I shall hand over the Presidency after what will, I know, have been for me a very pleasant year of office.



S. H. Lee

INSTITUTE NEWS

Spring Meeting, London, 21-23 March

As previously announced, the 1961 Spring Meeting will be held in London from Tuesday to Thursday, 21-23 March, inclusive. The Council hopes that there will be a large attendance of members and their guests. In particular, it is hoped that members will give their support to the Annual Dinner and Dance at Grosvenor House.

All members resident in Europe will receive a programme of the meeting, giving further details and a Reply Form for completion and return. Others, resident outside Europe, are requested to apply for copies if they intend to attend the meeting.

PROVISIONAL PROGRAMME

Tuesday, 21 March

Morning

Location: Church House, Great Smith Street, London, S.W.1.

10.0 a.m. Annual General Meeting:

- (a) Report of Council for the Year ended 31 December 1960.
- (b) Report of the Honorary Treasurer and Accounts for the Financial Year ended 31 August 1960.
- (c) Announcement of Election of Officers.
- (d) Vote of Thanks to Retiring Officers.
- (e) Installation of the new President, Professor H. O'NEILL, M.Met., D.Sc., F.I.M.
- (f) Vote of Thanks to the retiring President, Sir RONALD PRAIN, O.B.E., Hon. M.I.M.M.
- (g) Presidential Address by Professor H. O'NEILL, M.Met., D.Sc., F.I.M.
- (h) Presentation of Institute Medals:
 - (i) The Institute of Metals (Platinum) Medal.
 - (ii) The Rosenhain Medal.
 - (iii) The W. H. A. Robertson Medal and Premium.

Afternoon

Location: Church House, Great Smith Street, London, S.W.1.

Two concurrent scientific sessions:

Session "A"

2.30 p.m. Discussion on "Compatibility Problems in Gas-Cooled Reactors", arranged by the Nuclear Energy Committee.

Session "B"

2.30 p.m. Discussion on "Aluminium Alloys", based on the following papers published in the *Journal* before the meeting:

- (1) "The Effect of Fatigue Deformation on the Dispersion of Subsequent Precipitation in Aluminium Alloys", by C. A. Stubbington (No. 1974; Jan. 1960).

- (2) "The Ageing Characteristics of Complex Al-Zn-Mg Alloys: Distinctive Effects of Copper and Silver on the Ageing Mechanism", by I. J. Polmear (No. 2026; Oct. 1960).
- (3) "The Properties of Commercial Al-Zn-Mg Alloys: Practical Implications of Trace Additions of Silver", by I. J. Polmear (No. 2051; Feb. 1961).
- (4) "Atmospheric Corrosion-Fatigue of Age-Hardened Aluminium Alloys", by T. Broom and A. Nicholson (No. 2049; Feb. 1961).

Evening

Lecture Theatre, The Royal Institution, Albemarle Street, London, W.1.

May Lecture by Professor M. Polanyi, D.Sc., F.R.S.

Council Dinner in honour of the May Lecturer.

Wednesday, 22 March

Church House, Great Smith Street, London, S.W.1.

Morning

Two concurrent scientific sessions:

Session "A"

Discussion on "Copper Alloys", based on the following papers published in the *Journal* before the meeting:

- (1) "Precipitation in Commercial Copper-Beryllium Alloys", by A. R. Entwistle and J. K. Wynn (No. 2023; Sept. 1960).
- (2) "The Development of Strain Markings in Copper and Alpha-Brass: Some Effects of Deformation Temperature", by M. Hatherly (No. 2027; Oct. 1960).
- (3) "Stress Relaxation in Copper and Alpha-Brasses at Low Temperatures", by P. Feltham (No. 2053; Feb. 1961).
- (4) "The Effect of Low-Temperature Annealing on the Indentation Hardness of Cold-Worked Alpha-Brass", by C. Baird and P. H. Jennings (No. 2050; Feb. 1961).

Session "B"

Discussion on "The Contribution of Constitutional Research to General Metallurgical Problems".

Afternoon

Two concurrent scientific sessions:

Session "A"

Discussion on "X-Ray Fluorescence Analysis", in connection with which a paper on "X-Ray Fluorescence Analysis and its Application to Copper Alloys", by F. R. Bareham and J. G. M. Fox (No. 1992; Apr. 1960) is relevant.

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Session "B"

- 2.30 p.m. **Discussion on "The Contribution of Constitutional Research to General Metallurgical Problems",** continued from the morning session, if desirable.

Evening

- 7.30 to 10.30 p.m. **Conversazione and Exhibition** at 17 Belgrave Square, London, S.W.1. The string orchestra of the Royal Regiment of Artillery will play a programme of music during the evening. There will be a licensed bar.
Dress: Informal. Tickets, price 10s., inclusive of coffee and light refreshments. Ladies and other guests of members will be welcome.
Offers of exhibits (with details of table space, wall space, and electrical points required) should be sent to The Secretary.

Thursday, 23 March

Location: Church House, Great Smith Street, London, S.W.1.

Morning and Afternoon

Two concurrent scientific and technical sessions:

Session "A"

- 10.0 a.m. to 12.30 p.m. and 2.30 to 4 p.m. **Discussion on "Extrusion",** arranged by the Metallurgical Engineering Committee, and based on the following papers published in the *Journal* before the meeting. The papers will be introduced by Dr. J. M. Alexander (City and Guilds of London Institute).
- (1) "The Cold Extrusion of Metals Using Lubrication at Slow Speeds", by R. J. Wilcox and P. W. Whitton (No. 1911; May 1959).
 - (2) "Further Experiments on the Cold Extrusion of Metals Using Lubrication at Slow Speeds", by R. J. Wilcox and P. W. Whitton (No. 1957; Dec. 1959).
 - (3) "Resistance to Deformation of Aluminium and Some Aluminium Alloys: Its Dependence on Temperature and Rate of Deformation", by R. R. Arnold and R. J. Parker (No. 1978; Feb. 1960).
 - (4) "Temperature Changes Occurring During the Extrusion of Aluminium, Tin, and Lead", by A. R. E. Singer and J. W. Coakham (No. 2048; Feb. 1961).
 - (5) "Temperature Changes Associated with Speed Variation During Extrusion", by A. R. E. Singer and S. H. K. Al-Samarrai (No. 2056; Mar. 1961).

Session "B"

- 10.0 a.m. to 12.30 p.m. and 2.30 to 4 p.m. **Discussion** to be arranged by the Metal Physics Committee.

Evening

7.0 for 7.30 p.m. **ANNUAL DINNER AND DANCE** in the Ball Room, Grosvenor House, Park Lane, W.1. Dress: Evening dress or uniform, with decorations.

Tickets, price £2 2s., including coffee, but not drinks.

Tables may be reserved for parties of 8 to 12; and other tickets may also be applied for now.

Election of Honorary Member

Professor WILLIAM HUME-ROTHERY, O.B.E., Ph.D., M.A., D.Sc., F.R.S., Isaac Wolfson Professor of Metallurgy in the University of Oxford, has been elected an Honorary Member of the Institute.

Election of Fellows

In recognition of the services they have rendered to the Institute over many years, the Council has elected Major C. J. P. BALL, D.S.O., M.C., F.R.Ae.S.; Dr. MAURICE COOK, Hon.A.C.T.(Birm.), F.I.M.; and Lieut.-Colonel S. C. GUILLAN, T.D., as Fellows of the Institute. The total number of Fellows is restricted to twelve.

"Metallurgical Reviews", Vol. 5, No. 20.

The latest issue of *Metallurgical Reviews* contains: "The Continuous Casting of Copper and Its Alloys", by A. Kreil, H. Vosskühler, and K. Walther; "Complex-Stress Creep of Metals", by A. E. Johnson; and "Bearing Materials", by P. G. Forrester.

Metallurgical Reviews, published quarterly, is available only by subscription, the rates being: members 32s. 6d. (\$5.00), post free; non-members 50s. (\$7.50), post free.

Election of Members

The following 11 Ordinary Members, 2 Junior Members, and 14 Student Members were elected on 9 November 1960:

As Ordinary Members

BAUER, Alfred F., M.E., Assistant General Manager and Chief Engineer, Doepler-Jarvis Division, National Lead Co., Toledo, Ohio, U.S.A.

CHAMBERLAIN, Willard Thomas, B.E., Metallurgical Manager, Torrington Division, Anaconda American Brass Co., Waterbury, Conn., U.S.A.

GRAY, Paul Norman, A.C.T. (Birm.), L.I.M., A.T.O. (Metallurgical), Titanium Melting Plant, Imperial Chemical Industries, Ltd., Metals Division, Birmingham.

GRIEDER, Max, Dipl.-Ing., Industrial Engineer, Metallwerke AG., Dornach, Switzerland.

HANSON, Albert, M.Sc., Ph.D., Metallurgist, Hanson Parr Engineering, Ltd., Edmonton, Alberta, Canada.

LOWE, William Maurice, Senior Technical Assistant, Physical Metallurgy Section, Research Department, A.E.I. (Manchester), Ltd., Manchester.

MARSHALL, Robert, G.I.Mech.E., Experimental Engineer, Ferranti, Ltd., Edinburgh.

MILLS, Eric, B.Sc., Divisional Metallurgist, Mineral Insulated Cables Division, British Insulated Callender's Cables, Ltd., Prescot.

OKIJIMA, Kihachi, D.Eng., Misahashi Institute of Technology, Setagaya-ku, Tokyo, Japan.

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WADA, Professor Ryocho, D.Eng., Yokohama National University, Yokohama, Japan.

WALLACE, Robert Edward, M.S., Lockheed Aircraft Corp., Palo Alto, Calif., U.S.A.

As Junior Members

NICHOLSON, Michael Lang, B.Sc., Physical Metallurgist, Triplex Safety Glass Fundamental Research Laboratory, Balsall Common, War.

WOODINGTON, Michael Geoffrey, L.I.M., Research Metallurgist, Rotax, Ltd., London.

As Student Members

ALTSCHULER, Thomas Lafe, M.S., Postgraduate Student, Department of Metallurgy, University of Oxford.

CHASTELL, Derek John, Laboratory Assistant, British Non-Ferrous Metals Research Association, London.

EAMES, Peter John Charles, Student Metallurgist, John Dale, Ltd., London Colney.

EVANS, (Miss) Barbara Christieny, B.Sc., Honours Student, Department of Metallurgy, University College, Cardiff.

HILL, Richard George Cowper, B.A., Research Student, Department of Metallurgy, University of Oxford.

HISCOCKS, Stephen Edward, B.Sc., N.A.T.O. Research Student, Department of Metallurgy, University of Oxford.

JONES, David George, Student, Birmingham College of Advanced Technology, Birmingham.

KOTVAL, Peshotan Sohrab, B.Sc., Postgraduate Student, Department of Metallurgy, University of Sheffield.

LEWIS, Michael Harold, B.Sc., Research Student, Department of Metallurgy, University of Oxford.

NICHOLSON, David, Department of Metallurgy, King's College, University of Durham, Newcastle-upon-Tyne.

PIPER, Donald Ernest, B.Sc., Research Student, Department of Metallurgy, University College, Cardiff.

PRESTON, Raymond Anthony, B.Sc., Research Student, Department of Metallurgy, King's College, University of Durham.

RALPH, Brian, Undergraduate, Department of Metallurgy, University of Cambridge.

STICKELS, Charles Arthur, M.S.E., Graduate Student, Department of Chemical and Metallurgical Engineering, University of Michigan, Ann Arbor, Mich., U.S.A.

The following 8 Ordinary Members, 1 Junior Member, and 21 Student Members were elected on 25 November 1960:

As Ordinary Members

BAILEY, (Miss) Lois C., A.B., B.L.S., M.A., Librarian, Fondren Library, Southern Methodist University, Dallas, Tex., U.S.A.

BIDDLE, William Francis, A.I.M., Senior Inspector of Nuclear Installations, Ministry of Power, London.

CLARK, John Owen Edward, B.Sc., Chief of Process Applications Laboratory, Marconi's Wireless Telegraph Co., Ltd., Research Laboratories, Chelmsford.

CZIKEL, Professor Josef, Dr.-Ing.habil., Professor für Giessereikunde, Bergakademie Freiberg, Freiberg, (Sachsen), Germany.

HOOKER, (Mrs.) Ruth H., Librarian, United States Naval Research Laboratory, Washington, D.C., U.S.A.

NEWELL, Charles Robert, L.I.M., Works Metallurgist, Hoover (Electric Motors), Ltd., Cambuslang.

WOODHEAD, Jack Harper, B.Met., Lecturer, Department of Metallurgy, University of Sheffield.

ZOLLER, Heinrich, Dipl.phys., Dr.sc.nat., Aluminium A.G., Forschungsinstitut, Neuhausen-am-Rheinfall, Switzerland; temporarily at Star Aluminium Co., Ltd., Wolverhampton.

As Junior Member

BHATTACHARJEE, Ajit Kumar, B.Sc., Metallurgist, International Combustion, Ltd., Derby.

As Student Members

ARMITAGE, William Keith, B.Sc., Post-Graduate Student, Department of Metallurgy, University of Leeds.

BARTLE, Michael John, Undergraduate, Department of Metallurgy, King's College, University of Durham, Newcastle-upon-Tyne.

BLENKINSOP, Paul Addyman, Undergraduate, Department of Metallurgy, University of Leeds.

CAISLEY, John, Undergraduate, Department of Metallurgy, University of Leeds.

COOKE, Constan John, B.A., Research Student, Department of Metallurgy, University of Oxford.

CZOCZ, Kazimierz Zygmunt, Student, Battersea College of Technology, London.

DENNIS, Peter Patrick, Undergraduate, Department of Metallurgy, University of Leeds.

DULIEU, David, B.Sc., Research Student, Department of Metallurgy, University of Leeds.

GAPULE, Ashok A., Student, 17 Ladbroke Square, London, W.11.

HORSFIELD, John, Undergraduate, Department of Metallurgy, University of Leeds.

JACKSON, Kenneth Thomas, Undergraduate, Department of Metallurgy, University of Leeds.

JAMIESON, Ronald MacLennan, A.R.C.S.T., Research Student, Department of Metallurgy, Royal College of Science and Technology, Glasgow.

MYERS, Trevor Alfred, B.Sc., Research Student, Department of Metallurgy, University of Leeds.

PARBAT, Rabindranath, B.Sc., Department of Metallurgy, Battersea College of Technology, London.

POLLARD, Geoffrey, B.A., Research Student, Department of Metallurgy, University of Leeds.

SASTRI, Aiyaswami Suryanarayan, B.Sc., Post-Graduate Research Student, Royal School of Mines, University of London.

SINCLAIR, Robin Anthony, B.Sc., Research Student, Department of Metallurgy, University of Leeds.

TEKIN, Erdogan, Undergraduate, Department of Metallurgy, University of Leeds.

THOMAS, Peter Eyton, Undergraduate, Department of Metallurgy, University of Leeds.

TROMANS, Desmond, B.Sc., Research Student, Department of Metallurgy, University of Leeds.

WILLOUGHBY, Arthur Frank Wesley, Undergraduate, Royal School of Mines, University of London.

"Metallurgical Abstracts" Printed on One Side of the Paper

Members and others are reminded that *Metallurgical Abstracts* can be supplied in the form of sheets, printed on one side only, for the convenience of those who wish to cut up the abstracts for pasting on cards.

Abstracts in this form are obtainable by annual subscription, the rates (post free) being members £3 10 0 (\$10.25), non-members £5 0 0 (\$14.45).

PERSONAL NOTES

LETTER TO THE EDITOR

What Should the Institute Publish?

SIR,

There has been a great deal of discussion lately on the type of matter the Institute should put in its *Journal* and the steps that should be taken by the Council and its various Committees to increase the interest of a particular section of its membership and to widen the appeal of the *Journal* and of the Institute's Annual Meetings. All this generally stems from a healthy enthusiasm in some particular section of the membership for more food to its own particular taste, but there seems to me a danger that what is offered may become unbalanced.

I am prompted to write this letter by:

(i) Observations made by academic metallurgists on the one hand and engineering metallurgists on the other to the effect that the contents of the *Journal* are only of interest to the other group.

(ii) The Howe Memorial Lecture delivered last summer to the American Institute of Mining and Metallurgical Engineers by Robert Mehl—our 1960 Platinum Medallist.

Mehl surveys in this "Commentary on Metallurgy" the whole metallurgical field and emphasizes the separate importance and the intercommunication of physical metallurgy, extractive metallurgy and engineering metallurgy. He points out that:

"Within our family group we have executives, businessmen, salesmen, operators, plant metallurgists, engineers and scientists".

I read his Lecture primarily as an appeal to each of these groups to recognize the existence of the other and to accept the undoubted fact of their mutual interdependence.

In The Institute of Metals we do not deal primarily with extractive metallurgy because that is essentially the field of our sister organization The Institution of Mining and Metallurgy, but we do try to cover equally physical metallurgy and engineering metallurgy, if we may adopt Mehl's term for this purpose.

The arguments at the moment that one hears frequently from the academic side that the *Journal* is only concerned with metallurgical engineering and from the production side that the *Journal* is only concerned with high science are not only untrue—though the latter is more nearly true than the former—but seem to indicate an insular habit of thought that should surely be discouraged. The Institute's membership is fairly equally divided between scientific workers and those engaged in production, although weighted on the production side. It would no doubt be arguable that the *Journal* should be so divided that each has its own share of interest. My plea is that this division of the interests of our members surely is in danger of being over-emphasized. Are we really to accept the view that the scientific metallurgist is not interested in production processes? What sort of an education is given in a University Department where the students can say that they are losing interest in The Institute of Metals because the sessions at the Bath Meeting were nearly all devoted to metallurgical engineering? He is surely a poor metallurgist who is not interested in high-temperature creep and fatigue, recovery and recrystallization, methods of bar manufacture, or rolling lubricants. Should not another sentence from Mehl be taken to heart:

"Nowadays, a young Ph.D. research metallurgist, driven by the increasingly heavy demands of scholarship, shortly loses touch with the practical field, and this is a tragedy, for so much of basic metallurgical science has come from a study of the phenomena observed in industry—the metallurgical plant is a living museum of entrancing phenomena".

On the other hand should not the production metallurgist be interested in at least a number of the scientific papers, since it is from those papers that ideas applicable to his future practices will from time to time emerge?

We seem to be running at the moment toward a division between the scientific and engineering sides of our profession which surely is quite ridiculous. I only hope that by merely calling attention to this trend I shall have done something to avoid it.

Yours faithfully,

G. L. BAILEY,
Director, British Non-Ferrous Metals
Research Association.

London, N.W.1.

LOCAL SECTION NEWS

Oxford Local Section

The attention of members is drawn to an error in the date of the February meeting of the Oxford Local Section, as given in the Institute Programme of Meetings. The lecture by Dr. V. Heine on "New Aspects of the Electron Theory of Metals" will be given on Tuesday, 7 February, not 5 February.

PERSONAL NOTES

MR. G. ABOWITZ has been appointed Assistant Professor of Materials at Cornell University, Ithaca, N.Y.

DR. J. L. ASTON has left Head, Wrightson and Co., Ltd., to become lecturer in metallurgy at Constantine Technical College, Middlesbrough.

MR. D. A. BANKS has left Stewarts and Lloyds, Ltd., and taken up an appointment with the U.K. Atomic Energy Commission, Windscale, Cumberland.

MR. J. BARDSLEY has left the U.K. Atomic Energy Commission and is now employed in the Nuclear Metals Division of A.E.I. (Manchester), Ltd.

MR. J. K. BEAN has left Rhokana Corporation, Ltd., to become Assistant Smelter Superintendent at the Alaska Smelter of the Messina Rhodesia Smelting and Refining Co., Ltd.

MR. N. BIRKS is now working at the Max-Planck Institut für Physikalische Chemie, Göttingen.

MR. K. BROMAGE has left Imperial Chemical Industries, Ltd., Metals Division, and is now engaged in the Welding Section of Tube Investments Technological Centre, Walsall Airport, Staffs.

PROFESSOR DR. W. G. BURGERS, Corresponding Member to the Council for the Netherlands, has been awarded the degree of Doctor *honoris causa* by the University of Strasbourg. This honour will give great pleasure to his many friends within the Institute.

PERSONAL NOTES

MR. L. S. BUSCH has left Mallory-Sharon Metals Corp., Niles, Ohio, and is now Technical Manager, Beryllium Fabrication Section, Brush Beryllium Company, Elmore, Ohio.

PROFESSOR BRUCE CHALMERS, Harvard University, has received the Albert Sauveur Achievement Award, sponsored by the American Society for Metals.

MRS. F. M. CHAMBERS (*née* MACBRIDE) has been appointed a lecturer in the College of Further Education, Bromsgrove, Worcs.

DR. A. S. COFFINBERRY, of the Los Alamos Scientific Laboratory, is on a year's leave of absence at the Centre d'Etude pour les Applications de l'Energie Nucléaire, Mol, Belgium.

MR. J. F. G. CONDÉ has been transferred from the Development and Engineering Group of the U.K. Atomic Energy Authority, Risley, to A.E.E., Winfrith, Dorset.

DR. F. B. CUFF, JR., has returned to the Massachusetts Institute of Technology from IRSID.

PROFESSOR J. W. CUTHERBERTSON has been awarded the Hothersall Memorial Medal of the Institute of Metal Finishing.

MR. BYRON DAVIES has left University College, Swansea, and is now at Stewarts and Lloyds, Ltd., Corby, Northants.

DR. N. F. EATON is now at the Research Department, Associated Electrical Industries (Manchester), Ltd., Manchester.

PROFESSOR F. A. FORWARD, Head of the Department of Metallurgy at the University of British Columbia, has received one of the 1960 John Scott Awards of the City of Philadelphia for his invention of the Forward process for extracting nickel and other metals from ore concentrates. The award, consisting of a copper medallion and a \$1000 cash prize, was made at a fellowship dinner of the Metallurgical Society of the A.I.M.E. during its Fall Meeting in Philadelphia.

MR. J. R. FREEMAN, JR., has retired from the American Brass Co., Waterbury, Conn.

DR. J. GARSTONE has left The United Steel Companies, Ltd., and is now Chief Research Metallurgist of Quasi-Arc, Ltd., Bilston, Staffs.

DR. H. K. HARDY has been appointed Director of Fuel Element Development, U.K. Atomic Energy Authority, Risley, Lancs.

MR. W. HARRISON has completed his graduate apprenticeship at Rolls-Royce Ltd., Aero Engine Division, Derby, and is now employed in their Material Test Laboratory.

DR. R. T. HOWARD has left the James W. Weldon Laboratory, Kansas City, to become Professor of Engineering in the University of Wichita.

MR. C. J. HUFFMAN is now manager of the aluminium extrusion plant of Almatco, Inc., Nesquichoning, Pa.

MR. D. B. HUNTER has left The General Electric Co., Ltd., and taken up an appointment with Samuel Denison and Son, Ltd., Leeds.

MR. R. S. JACKSON has now left Deloro Stellite, Ltd., to take up an appointment as Senior Lecturer in the Department of Metallurgy, College of Advanced Technology, Birmingham.

DR. W. B. JEPSON is now at the Metallurgy Division, Atomic Energy Research Establishment, Harwell.

MR. V. B. JOHN has left Reynolds T.I. Aluminium, Ltd., to become lecturer in metallurgy at The Polytechnic, Regent Street, London.

MR. H. K. JØRGENSEN has left Andersen and Bruun's Fabriker A/S, and joined Dansk Industri Syndikat A/S, Copenhagen.

MR. D. E. KING has left the Cerro de Pasco Corp., La Oroya, Peru, and is now at the Widnes Works of McKechnie Bros., Ltd.

MR. J. M. LEVY has left Birmingham University and is now with Birmetals, Ltd., Birmingham.

MR. MERVYN OWEN has left Canada and is now with the Cerro de Pasco Corp., La Oroya, Peru.

MR. C. M. SELLARS is to spend two years in the Metals Research Laboratory, Carnegie Institute of Technology, Pittsburgh.

MR. J. S. SHEASBY has been awarded a British Commonwealth Scholarship tenable in Australia and is now working in the Metallurgical Department, University of New South Wales, Kensington, N.S.W.

MR. R. F. SMART has been awarded the Ph.D. degree of London University and has left the Tin Research Institute to take up an appointment in the Development and Research Department of The Mond Nickel Co., Ltd., Birmingham.

MR. ANTHONY TAYLOR has taken up an appointment as Research Associate in the Department of Engineering Physics, Cornell University, Ithaca, N.Y.

MR. F. E. WHITE has joined the staff of the Institut de Recherches de la Sidérurgie, St. Germain-en-Laye (S. et O.), France.

MR. M. G. WRIGHT has left University College, Swansea, and is now a metallurgist in the Atomic Energy Division of The General Electric Co., Ltd., Erith, Kent.

MR. R. R. MOORE of the Naval Air Material Centre, Philadelphia, has been awarded a Certificate of Merit by the Franklin Institute.

MR. R. S. PRATT has been appointed technical and research director, Bridgeport Brass Co., Bridgeport, Conn.

MR. R. A. QUADT has been appointed president of Reactive Metals Inc.; he remains a vice-president of Bridgeport Brass Co., which will manage Reactive Metals.

MR. A. SNOWMAN is now a metallurgical project engineer at High Purity Metals, Inc., Hackensack, N.J.

MR. R. J. SOUTHIN has left J. Stone and Co., Ltd., to take up an appointment as scientific officer in the Defence Standards Laboratories, Department of Supply, Maribyrnong, Vic., Australia.

MR. J. E. THOMPSON has left the Montana School of Mines and is now an associate engineer (metallurgical) with the Union Carbide Nuclear Company, Oak Ridge, Tenn.

LECTURES TO LOCAL SECTIONS AND ASSOCIATED SOCIETIES

Death

The Editor regrets to announce the death of:

PROFESSOR GEORGE SACHS, Research Professor and Associate Director, Syracuse University Research Institute, Syracuse, N.Y., on 29 October 1960.

OBITUARY

Mr. J. H. Stuart

The Scottish Local Section suffered a second severe blow this year by the death, on 25 October, of its Chairman, Mr. J. H. Stuart, who only last January had succeeded the late Mr. H. S. S. Murray. Although in office for so short a time, Mr. Stuart had exerted a definite influence on the activities of the Section and his loss will be keenly felt.

James Horace Stuart was born in Edinburgh in 1908 and educated at George Heriot's School and Edinburgh University, where he studied metallurgical chemistry. In 1929 he joined the staff of E. Chalmers and Co., Ltd., Leith, in the early days of their Non-Ferrous Metal Department, specializing in the requirements of casting metal and technique in the non-ferrous foundries. He was a Local Director of the Company at the time of his death.

Mr. Stuart became a member of the Institute in 1938 and had served on the Scottish Local Section committee since 1955. For many years he was an officer of the Auxiliary Fire Service and his other activities included golf and sailing.

Dr. E. Voce

Dr. Eric Voce, who held an eminent position in the field of copper metallurgy, died on 26 October 1960, at the age of 58. He had not enjoyed particularly good health during the past few years, but did not allow this to impede his activities. The news of his sudden and untimely passing was received with sincere sorrow by his many friends in the industry.

Dr. Voce was educated at King Edward's Grammar School, Birmingham, and graduated in metallurgy at Birmingham University. Thereafter, his metallurgical career was concerned almost exclusively with copper-base materials. From 1924 to 1926 he was engaged in research work on the copper-silicon alloys at Birmingham University on behalf of the British Non-Ferrous Metals Research Association. For the following four years he was Superintendent of the casting shop at Barker and Allen, Ltd., Birmingham. After this, he rejoined the staff of the B.N.F.M.R.A., where, in addition to supervising the metallography department, his principal researches were concerned with copper alloys for high-temperature service, the embrittlement of copper by bismuth, and the intercrystalline failure of brass in corrosive media.

From 1946 until his death, Dr. Voce was Senior Metallurgist of the Copper Development Association, and he also served on numerous committees of the British Standards Institution concerned with copper and copper alloys. Much of his spare time was devoted to his own theory of the strain-hardening of metals—a study which he described as his "hobby"—and he published several papers in this field.

Dr. Voce was held in high regard by all his friends and colleagues and by his fellow committee members. His greatest personal qualities were kindness and a particular ability and willingness to give helpful advice. His wise counsel was always most generously given and will be sadly missed by all who benefited from it.

A. P. C. H.

LECTURES TO LOCAL SECTIONS AND ASSOCIATED SOCIETIES

The Extrapolation of Creep Tests:

A Review of Recent Opinion

DR. N. P. ALLEN (Superintendent of the Metallurgy Division, National Physical Laboratory) gave the lecture to the London Local Section on the occasion of its annual meeting at the Royal School of Mines on 3 November 1960.

In the lecture, attention was drawn to the fact that the power plant in both conventional and nuclear power stations was designed from knowledge of creep data for a service life $>100,000$ h. Although many countries were now committed to carrying out creep tests approaching this duration, it was impossible to wait this length of time before constructing plant with new and advanced materials. Extrapolation from shorter-time tests was therefore unavoidable.

Long-time creep tests started by the Germans shortly after the war had now exceeded 50,000 hours' duration. The results of these tests had been presented at a conference in Düsseldorf in June last, when several contributors had compared the accuracy of various extrapolation parameters. The Larsen-Miller and Sherby-Dorn parameters had been found to be reasonably good for short extrapolations and were superior to the Manson-Haferd and the Oding-Geminov methods. For long extrapolations, the Sherby-Dorn method had appeared the best. The opinion was expressed that Glen's method, involving extrapolation of incomplete curves of momentary creep rate against extension to be consistent with a family of curves obtained in shorter-time tests, was insufficiently precise.

The lecturer considered that all these methods were too indirect and took too little advantage of the experience of long-time creep testing. Examination of the long-time German data revealed that log stress/log time curves for specific strains and for rupture at any one test temperature changed their slopes with time in a consistent manner that enabled the slope at long times to be forecast from short-time tests. Application of this method to Cr-Mo-V and austenitic steels showed that approximately 70% and 80%, respectively, of the extrapolations were correct within 10%. All predictions were within 25% of the correct value.

Another direct method of extrapolation based on the consideration that the rates of creep and of self-diffusion are fundamentally related to each other was presented. Thus, plots of the reciprocal of the absolute temperature against log time to reach specific strains and rupture at a constant stress could be extrapolated to be asymptotic to straight lines of slope given by the activation energy of self-diffusion. Applying this method to N.P.L. results on two steels tested up to 100,000 h showed that predictions made from tests of only 5000 hours' duration were within 10° C of the correct results. It was considered that both these methods of extrapolation, together, should be used to predict the 100,000-h creep properties of a material.

Symposium on Solidification

The meeting of the Sheffield Local Section on 20 October took the form of a symposium on "Solidification", to which

contributions were made by Mr. A. CIBULA (British Non-Ferrous Metals Research Association), Mr. I. C. H. HUGHES (British Cast Iron Research Association), and Mr. L. J. WATKINS (British Steel Castings Research Association).

Mr. Cibula said that the mode of solidification and feeding practice were closely dependent upon the freezing range of the cast alloy. Pure metals and short-freezing-range alloys solidified by skin formation, resulting in the formation of a secondary pipe at the heat centre. The principal feeding force was atmospheric pressure, which enabled the technique of blind feeders to be employed. Long-freezing-range alloys, on the other hand, solidified in a pasty manner, which resulted in the formation of microporosity scattered through the section, and this led to the important effects of grain size and dissolved gas released on solidification. These were discussed.

Mr. Watkins said that the mode of solidification of a metal was controlled by composition and rate of heat extraction. Steels were solid-solution alloys and thus solidified in a pasty manner. The width of the pasty zone increased with the carbon content, resulting in interdendritic porosity in the higher-carbon steels, which it was practically impossible to eliminate by feeding. The effect of increased carbon content was counteracted by increasing the rate of heat extraction. This reduced the width of the pasty zone, and made feeding much easier, since the length of the narrow interdendritic channels was reduced. The high temperature level of solidification and the relatively low thermal conductivity of steel both favoured the establishment of high temperature gradients and hence a high rate of solidification.

An increase in the rate of solidification caused a change in macrostructure from a coarse dendritic structure to a fine equiaxed one. The macrostructure was also modified by the gravitational segregation of crystallites and by the presence of convection currents.

In order to obtain sound castings, it was necessary to control solidification. This was achieved by obtaining controlled directional solidification whereby an ever-open feed channel was maintained. The measures taken to obtain controlled directional solidification included ensuring that heavy sections were above light ones and the use of chills on castings that could not be so favourably placed.

Finally, Mr. Hughes described the microstructure and constitution of grey cast iron and explained that the presence of graphite was responsible for the unique combination of properties of this material. The presence of graphite in the eutectic also led to grey cast iron behaving, during solidification, in a manner differing from that of steel and most of the non-ferrous alloys. Solidification involved both contraction and expansion stages, and most of the irons had a net expansion. Although this might be expected to lead invariably to soundness, in fact a number of apparent shrinkage defects might arise, and their causes were examined.

The essential problem in obtaining sound castings lay in the fact that there was a tendency for castings to expand overall, while unsoundness developed within them, particularly at hot spots. This expansion could be prevented by using sufficiently rigid moulds obtained by hard-ramming green sand or by special processes. Casting expansion was also related to pouring temperature and to the eutectic cell number. A high number of eutectic cells, as produced by inoculation, was undesirable, and high pouring temperatures were generally undesirable except in small dry-sand-moulded castings. Nodular irons were unsound because of a greater casting expansion force; they might be made sound in rigid moulds without feeding requirements.

Phosphorus tended to cause unsoundness because it formed a low-melting-point network and it promoted casting expansion force. Phosphoric iron castings were made sound by uniform solidification in sufficiently firm moulds.

Some Metallurgical Problems in Atomic Energy

A lecture on "Some Metallurgical Problems in Atomic Energy" was given by Mr. B. W. MOTT, of the Atomic Energy Research Establishment, to the Southampton Metallurgical Society on 29 September.

The three main subjects considered were: (1) problems associated with Calder-type fuel elements, (2) the development of pressure-vessel steels, and (3) the metallurgy of beryllium.

(1) Mr. Mott said that detailed metallurgical examination of discharged fuel elements from Calder and Chapelcross reactors, including those from channels in which leakage of fission products was suspected, played a vital part in predicting the performance of civil reactors. Faults had so far been established in less than one element in a thousand, of which about half failed because of small manufacturing defects or because of handling damage. The remaining defects were due to linkage of grain-boundary cavities formed by creep of the Magnox can to accommodate the strain imposed by irradiation growth of the fuel. Development work continued with a view to improving the performance of both the canning materials and the fuel. Swelling due to fission-product gases was not a major problem in Calder-type reactors, but it would become more important in civil reactors in which the uranium might reach temperatures of 600° C and above. The factors affecting swelling were as yet incompletely understood, but it appeared that one important step was to keep thermal cycling to a minimum.

(2) As with other large steel structures, attention had to be paid to the avoidance of brittle fracture in pressure vessels by eliminating stress concentrations, devising full stress-relief treatments, and the use of conservative design stresses. A complicating factor was that irradiation raised the ductile → brittle transition temperature by an amount which approximated to $c(\phi)^t$ where ϕ was the neutron flux, t the time of exposure, and c a constant which depended on the temperature of irradiation, grain size, and type of steel. The increase in transition temperature was due mainly to increased resistance to dislocation movement caused by clusters of point defects produced by irradiation.

(3) Cast beryllium billets were too coarse-grained and brittle for fabrication, so that the preferred method of preparing tubes was via a powder-metallurgy route. Extruded tubes exhibited a high degree of texture which was relatively independent of extrusion temperature, but dependent on the degree of deformation. Although the oxidation of beryllium in carbon dioxide generally followed a parabolic law, a breakaway type of failure could occur which was incompletely understood. On irradiation, the metal could become embrittled by the generation of point defects and might exhibit swelling at temperatures $> 800^{\circ}$ C owing to the helium formed by two nuclear reactions involving fast reactors.

Mr. Mott concluded by saying that atomic energy had not only provided a unique opportunity for the metallurgist to show his mettle, but had also given valuable stimulus to metallurgical science in general.

JOINT ACTIVITIES

Casting

A lecture on "Casting" was given by Dr. D. V. ATTERTON (Managing Director, Foundry Services, Ltd.) to the Manchester Metallurgical Society on 9 November 1960.

The lecture was concerned with recent developments in the casting of ingots and billets in both ferrous and non-ferrous metals for wrought fabrication. Attention was given to the various types of defect that could occur in cast products, especially surface defects, inclusions, defects due to dissolved gas, and shrinkage. Various new processes were then reviewed in the light of their influence upon such defects; in addition, new processes for increasing the rate of production of castings, or alternatively the yield of usable material from any casting operation, were also covered.

The problem of hydrogen in steel was reviewed in some detail, particular attention being given to methods of vacuum pouring. A large number of techniques recently developed for improved ingot feeding were next surveyed, with typical examples from both ferrous and non-ferrous practice. The direct chill process for the production of aluminium billets was described in detail, particular emphasis being laid upon methods of metal transfer and the defects encountered with various alloy types. Finally, truly continuous processes were reviewed, especially the Hunter-Douglas, Properzi, and Hazelett processes.

The lecture concluded with the author's views of likely future developments in the casting industry.

Techniques in Investigation of Metallurgical Failures in Aircraft Components

At a meeting of the North East Metallurgical Society on 18 October 1960, Mr. D. A. RYDER (Royal Aircraft Establishment, Farnborough) spoke on "Techniques in Investigation of Metallurgical Failures in Aircraft Components".

He said that for the purpose of the lecture it was convenient to classify failures into non-fracture and fracture cases. Failures not involving fracture, e.g. those due to corrosion, erosion, electrical arcing, and defective material or heat-treatment, could best be dealt with by conventional metallographic techniques backed up by chemical analysis, mechanical testing, radiography, and X-ray diffraction. It was occasionally necessary to modify an existing technique to deal with a particular problem, and the development of a reflected-light method of detecting small defects on curved surfaces was quoted as an example.

In dealing with specimens that had actually broken, the primary task of the investigator was to determine the mode of fracture and its point of origin. Chevron markings which arose from a crack propagating at different levels were useful in determining directions of fracture, but were occasionally misleading if the crack front changed the sign of its curvature as the crack grew. Stress-corrosion and fatigue were the major causes of failure in the high-strength light alloys used in aircraft construction, and it was sometimes difficult to distinguish between them, since both often displayed conchoidal progression markings and apparent lack of ductility. Stress-corrosion fractures could be classified into two major types, those that occurred in forgings, and were often associated with flash-line weakness and high internal stress, and those in extrusions, usually resulting from high assembly stresses applied across the fibre structure of the material. With fatigue fractures it was often possible to determine the type of stress system that had caused failure from the geometry of

the fracture surface. The origin of the fracture could usually be found and the influence of fretting, geometric stress concentrations, and corrosion assessed. Examination of fracture surfaces at very high magnifications with both the optical and the electron microscope was a useful diagnostic technique. Fatigue fractures often showed a characteristic pattern of striations, each produced by a single cycle of stress. Stress-corrosion fractures often showed a rather featureless structure with a superimposed network of small tilts, while tensile fracture surfaces were characterized by a pattern of shallow dimples, each usually associated with a central inclusion.

JOINT ACTIVITIES

Symposium on "User Experience of Large-Scale Industrial Vacuum Plant"

Following a recommendation by the Joint British Committee for Vacuum Science and Technology, the Council of the Institution of Mechanical Engineers have agreed to sponsor a Symposium of papers on "User Experience of Large-Scale Industrial Vacuum Plant", to be held at the Institution on 1 and 2 March 1961.

The main objective of the Symposium is to bring together designers and users of vacuum plant to discuss their problems and techniques. The Joint British Committee feel that designers and manufacturers will benefit from the opportunity to learn about users' experience with such plant, and that users will welcome an opportunity to place their experience on record.

The arrangements for the Symposium are being made by a Committee consisting of representatives drawn from constituent bodies of the Joint British Committee.

It is planned to discuss some twelve papers, which will be preceded by a general review paper.

The provisional programme is as follows:

Wednesday, 1 March 1961, 4.0-5.0 p.m.

Review paper, followed by a group of papers on vacuum processing and treatment of metals.

Thursday, 2 March 1961, 9.30 a.m.-1.0 p.m.

Further papers on metallurgical subjects, together with a contribution on steam-ejection vacuum plant and a paper on capacitor drying.

Thursday, 2 March 1961, 2.0-5.0 p.m.

A group of papers covering medical and food processing aspects.

Refreshments will be provided for delegates on each day. Registration will be required, for which application should be made to the Secretary of The Institution of Mechanical Engineers, 1 Birdcage Walk, London, S.W.1.

The British Conference on Automation and Computation

The rapid growth of automation, in which is comprised computation, process control, and data processing generally, led to a decision in 1957 by some twenty bodies of the learned-society type having interests in these fields, or in their social

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and economic implications, to set up a central organization to provide more effective liaison between the interested bodies, to be known as the British Conference on Automation and Computation.

The conference was divided into three autonomous Groups, as follows:

- A. The British Group for the Engineering Applications of Automation.
- B. The British Group for Computation and Automatic Control.
- C. The British Group for the Sociological and Economic Aspects of Automation Techniques.

At meetings of the three Groups held on 10 October 1960, it was agreed that the Conference would operate more effectively under a central Council and, accordingly, the Groups agreed to merge in a reconstituted organization. At the first (constitutive) meeting of the Council of the reconstituted B.C.A.C. which followed, it was announced that some thirty Societies (including the Institute of Metals) had transferred their membership to the new body.

The following were adopted as objects of the Conference:

- (a) To stimulate interest in, to spread knowledge of, and to foster the development and applications of automatic control and computation.
- (b) To afford a common meeting ground for the adhering organizations whereby such of their activities as fall within the purview of the Conference can, if they so desire, be co-ordinated and extended.
- (c) To encourage and, if desired, to co-ordinate the presentation at International Conferences of British papers whose subjects fall within the purview of the Conference.
- (d) To maintain, as may be desirable, liaison with other countries which support such International Conferences.

Sir Walter Puckey was elected Chairman of the Conference and Mr. W. K. Brasher (Secretary of The Institution of Electrical Engineers) Honorary Secretary, and the offer of The Institution of Electrical Engineers to provide secretarial services for the Conference was accepted.

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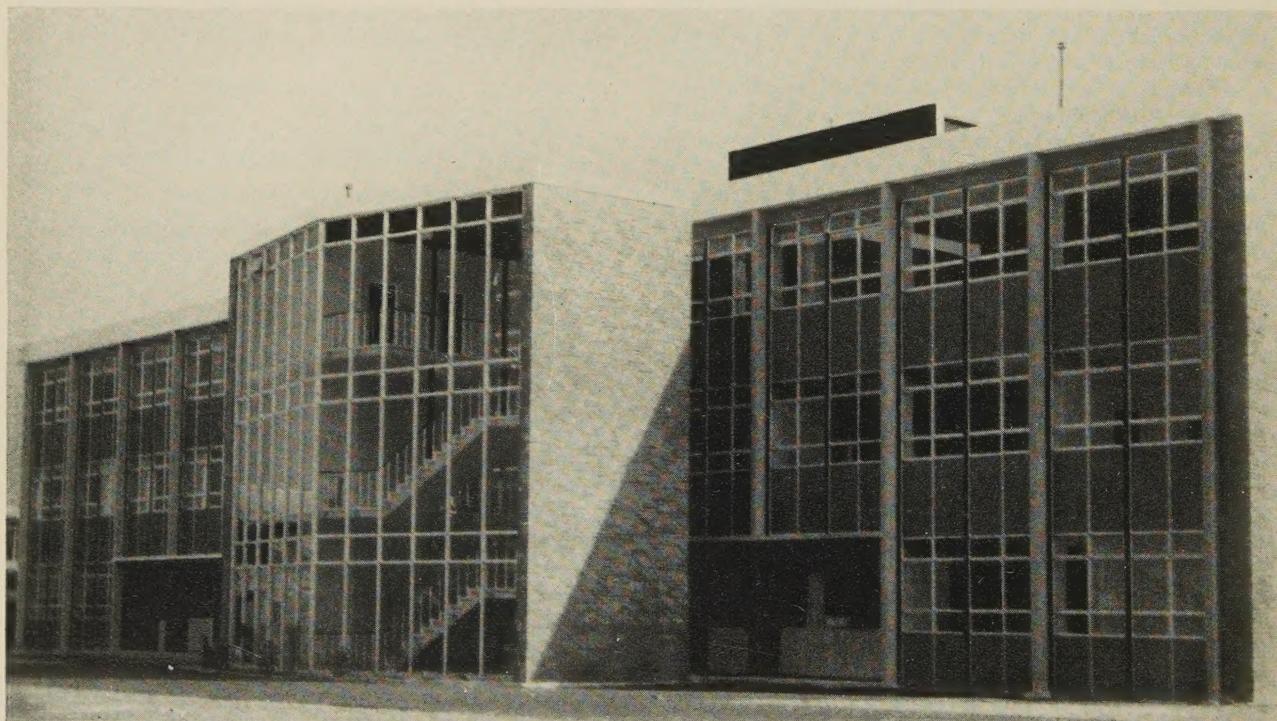
New Metallurgy Building Opened at the University of New South Wales

The recently completed building for the School of Metallurgy in the University of New South Wales, Sydney, was opened on 6 September 1960, by Mr. Colin Syme, Chairman of Directors of the Broken Hill Proprietary Company, Limited.

The building, which cost £328,000, consists of a three-storey block and a single-storey process wing, with a total floor area of approximately 35,000 sq. ft.

Functionally, the building is divided into several areas. The majority of the undergraduate work connected with the early years of the metallurgy courses is concentrated on the ground floor of the three-storey block. This includes a metallography suite, physical and extraction metallurgy laboratories for student experimental work, and a lecture room. The first floor has facilities for more advanced chemical and physical metallurgical work, a seminar and reading room, and the administrative suite, including a general office. The second floor will house the chemical research and analytical suites.

In the process wing is housed the heavier metal-melting and metal-deformation equipment and furnaces for high-temperature and conventional heat-treatment. There is also a process chemical bay and the main store.



Southern Aspect of the Main Block of the new Metallurgy Building, University of New South Wales

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Professor J. P. Baxter, Vice-Chancellor of the University, said that the opening of the new metallurgy building marked what might be called the beginning of the second stage in the development of the school. The first stage began in 1952 when Foundation Professor Rupert Myers joined the University. At that time he was faced with the not-altogether-unfortunate situation of having virtually no inheritance. During the eight years which had elapsed, a first-class staff had been assembled, undergraduate courses in metallurgy had been developed, three main and several subsidiary research programmes had been established, post-graduate lecture courses had been conducted, and the permanent laboratory accommodation described above had been planned and built. It was now in a commanding position to make a valuable contribution in the community by way of teaching, research, and assistance to industry.

Solid-State Physics at Harwell

A Solid-State Physics Division has been formed at the Atomic Energy Research Establishment, Harwell, under Dr. W. M. Lomer.

Its main aim will be to exploit for fundamental purposes the unique research facilities available at Harwell for solid-state investigations. In particular, work on neutron diffraction and scattering will be extended. One group, under Dr. G. E. Bacon, will be concerned with neutron crystallography, for magnetic and structural investigations and studies in crystal chemistry. Another group, under Mr. R. D. Lowde, will use a variety of techniques, such as time-of-flight measurement and the scattering of cold neutrons, to study the dynamics of crystals and of spin systems.

Magnetic investigations with polarized neutrons and studies of various physical properties employing radioactive tracers, resonance, and other techniques will form the work of a third group under Mr. A. D. Le Claire. Later a further group will be added to study defects in crystals. There will be opportunity for University participation in the programme.

Special Courses at Borough Polytechnic

Two special courses of metallurgical interest are being held during the Spring term at the Borough Polytechnic, Borough Road, London, S.E.1:

(1) "Recent Development in Non-Electrolytic Metal Finishing" (six lectures, 7.0 p.m. on Thursdays, beginning 12 January).

(2) "Metallurgy of the Rarer Metals" (six lectures, 7.0 p.m. on Tuesdays, beginning 7 February).

Further information may be obtained from Mr. G. Isserlis, Head of the Division of Metal Science.

Special Course on Causes and Prevention of Failures

A course of six lectures will be held at the Institute of Technology, Bradford, on successive Wednesday evenings at 7.0 p.m., starting on 18 January 1961. The course will begin with a general lecture on types of failure. Fatigue will be dealt with subsequently in detail. Other lectures will emphasize the types of failure that predominate in various branches of engineering. Application forms, giving full details, may be obtained from the Registrar, Institute of Technology, Bradford, Yorks.

"Modern Metallographic Techniques"

A course of seven lectures and five practical periods on "Modern Metallographic Techniques" is to be given at the Northampton College of Advanced Technology, "Angel" Annexe, 1 Islington High Street, London, N.1, on succeeding Wednesday afternoons, beginning on 11 January 1961. The fee for the course is 12 guineas.

Engineering, Marine, Welding, and Nuclear Energy Exhibition

The next Engineering, Marine, Welding, and Nuclear Energy Exhibition will be held at Olympia, London, W., from 20 April to 4 May 1961.

International Congress of Pure and Applied Chemistry

The XVIIIth International Congress of Pure and Applied Chemistry will be held in Montreal on 6-12 August 1961.

An outline of the proposed programme of papers for discussion is as follows:

A. PHYSICAL CHEMISTRY

Sec. 1. Structure and Reactivity of Small Molecular Species

- (i) Valence theory, free radicals and ions, electronically excited states.
- (ii) Theory of elementary processes, energy transfer processes, ion-molecule reactions.

Sec. 2. Solid State

- (i) Modern concepts of structure and bonding in crystals.
- (ii) Excitation processes, including thermal excitation (theory, absorption and luminescence spectra).
- (iii) Molecular motion and relaxation processes.
- (iv) Chemical reactions in solids.

Sec. 3. Chemical and Thermodynamic Properties at High Temperatures

- (i) Condensed States: (a) Phase equilibria and reactions at high temperature, (b) Preparation of pure and single-crystal products at high temperatures, (c) Pyrometry and physical measurements at high temperatures.
- (ii) Gaseous States: (a) Kinetics of thermal and radiated reactions in high-temperature gases and plasmas (with emphasis on shock tube techniques), (b) Fundamental studies of flames or plasmas applied to chemical and metallurgical processes.
- (iii) Thermodynamic Properties: (a) Vapour-pressure data and the properties of vapours (with emphasis on compounds containing three kinds of atoms), (b) Thermodynamics of fused salts, especially metal-fused-salt systems.

Sec. 4. Nuclear Chemistry

B. APPLIED CHEMISTRY

Sec. 1. Structure and Catalytic Activity of Metal Surfaces

Sec. 2. Metallurgical Processes

- (i) Slag-metal reactions.
- (ii) Reactions under pressure.
- (iii) Recovery of the less-common metals.

DIARY

Sec. 3. *Electrochemistry*

- (i) Molten salts.
- (ii) Kinetics of electrode processes.

C. ANALYTICAL CHEMISTRY

Sec. 1. *Analysis of Metals and Minerals*

- (i) Trace elements in metals and minerals.
- (ii) Gases in metals.

Sec. 2. *Analytical Chemistry of the Less-Common Metals*

D. ORGANIC CHEMISTRY SYMPOSIUM

A detailed programme will be published later. All correspondence concerning the Congress should be addressed to the Chairman, Central Committee, XVIIIth International Congress of Pure and Applied Chemistry, National Research Council, Ottawa, Canada.

Symposium on Ultrafine Particles

A symposium on ultrafine particles is being planned by the Electrothermics and Metallurgy Division for the Spring Meeting of the Electrochemical Society to be held in Indianapolis, Indiana, 30 April and 1-4 May 1961.

A comprehensive programme is planned, with emphasis on submicron materials prepared by vaporization and condensation techniques and reactions in the vapour state.

A thorough treatment of the subject, with eventual publication of the papers, is envisaged. It is hoped to solicit sufficient papers for a three-day programme of both invited and contributed papers. Topics on which contributions will be welcomed include:

1. Methods and techniques for the production of ultrafine particles. The mechanism of nucleation and growth of particles from the vapour state produced in various ways, including arc plasmas, amalgam techniques, shock tubes, vacuum evaporation and condensation, &c.

2. The nature of fine particles as they approach molecular dimensions. An imaginative, speculative paper would be welcomed on this subject.

3. The behaviour of ultrafine particles in processes involving sintering, hot pressing, dispersion strengthening of metals, intimate blending, surface chemistry, &c.

4. Physical measurements, including electron-microscopy and electron-diffraction techniques, particle size, surface area and particle size distribution, chemical activity, and electrical properties.

5. The properties of submicron powders of specific materials, including metals, oxides, carbides, borides, nitrides, &c.

6. Special subjects that do not fit into the above categories are also welcome.

Only those papers concerned with particles preponderantly less than 1 micron and preferably less than 0.1 micron will be considered. Papers on colloid chemistry will not be considered for this symposium.

Mr. W. E. Kuhn, Programme Chairman, Research and Development Division, The Carborundum Company, Niagara Falls, N.Y., U.S.A., would appreciate suggestions as to subjects which should be covered in the formal papers and specialists who would be willing to submit papers.

DIARY

The Institute

- 22 February. Informal Discussion on "Tube Production" arranged by the Metallurgical Engineering Committee. (College of Technology, Gosta Green, Birmingham 4, at 10.30 a.m.)
- 23 February. "The Theory of the Alloys of Copper" by Professor W. Hume-Rothery. (The Royal Institution, Albemarle Street, London, W.1, at 6.30 p.m.)

Local Sections and Associated Societies

- 26 January. Southampton Metallurgical Society. "Hot-Dip Galvanizing", by M. H. Davis. (Southampton University, at 7.15 p.m.)
- 26 January. West of England Metallurgical Society. "Recent Developments in Metallography", by Professor R. W. K. Honeycombe. (College of Technology, Ashley Down, Bristol 7, at 7.30 p.m.)
- 2 February. Birmingham Local Section. Students' Evening. Conversazione and Exhibition. (College of Technology, Gosta Green, Birmingham 4, at 6.30 p.m.)
- 2 February. London Local Section. "The Development of Some New Bearing Materials", by P. G. Forrester. (17 Belgrave Square, London, S.W.1, at 6.30 p.m.)
- 7 February. Leeds Metallurgical Society. "Metals in Antiquity", by Dr. R. F. Tylecote. (Metropole Hotel, Leeds, at 6.30 p.m.)
- 7 February. Oxford Local Section. "New Aspects of the Electron Theory of Metals", by Dr. V. Heine. (Cadena Café, Cornmarket Street, Oxford, at 7.15 p.m.)
- 7 February. South Wales Local Section. "Inspection of the High-Strength Wrought Aluminium Alloys", by W. Smitham. (Metallurgy Department, University College, Singleton Park, Swansea, at 6.30 p.m.)
- 8 February. Manchester Metallurgical Society. "Residual Stress and Stress Relieving", by Dr. L. E. Benson. (The Manchester Literary and Philosophical Society, George Street, Manchester, at 6.30 p.m.)
- 9 February. East Midlands Metallurgical Society. "The Modern Production and Metallurgy of Blackheart Malleable Cast Iron", by H. Greatorex. (Derby and District College of Art, at 7.30 p.m.)
- 9 February. Liverpool Metallurgical Society. "The Origin and Solution of Some Industrial Corrosion Problems", by E. C. Campbell. (Department of Metallurgy, University of Liverpool, at 7.0 p.m.)
- 13 February. Scottish Local Section. "Beryllium as a Structural Material", by Dr. A. J. Martin. (Institution of Engineers and Shipbuilders, Elmbank Crescent, Glasgow, C.2, at 6.30 p.m.)
- 16 February. Birmingham Local Section. "The Growth and Prospects of the Aluminium Industry", by G. W. Lacey. (College of Technology, Gosta Green, Birmingham 4, at 6.30 p.m.)
- 16 February. North East Metallurgical Society. "Plastics versus Metals", by Dr. P. T. Moore and H. Hughes. (Cleveland Scientific and Technical Institution, Corporation Road, Middlesbrough, at 7.30 p.m.)

APPOINTMENTS VACANT

- 21 February.** West of England Metallurgical Society.
"Metallurgy in Modern Jewellery", by Miss Dorothy Pile. (The College of Technology, Ashley Down, Bristol 7, at 7.30 p.m.)
- 22 February.** Manchester Metallurgical Society.
"Metallurgical Applications of Radioisotopes", by Dr. M. C. Inman. (The Manchester Literary and Philosophical Society, George Street, Manchester, at 6.30 p.m.)

LECTURES

LANCESTER COLLEGE OF TECHNOLOGY, COVENTRY

Course on

"MODERN TRENDS IN THE THEORY AND PRACTICE OF ELECTROPLATING"

A short course will be held on Thursday and Friday, 2 and 3 February 1961. Course Fee £1 2s. od. Further details and application forms from the Head of the Chemistry Department, Lanchester College of Technology, Priory Street, Coventry.

APPOINTMENTS VACANT

COMMONWEALTH OF AUSTRALIA



Defence Standards Laboratories

PHYSICAL METALLURGY OF WELDING

The Department of Supply invite applications for the following vacant position at the Defence Standards Laboratories, MELBOURNE:

SENIOR SCIENTIFIC OFFICER

SALARY: £2460-£2655 (Australian currency).

DUTIES: Research into physical metallurgy related to the welding of metals, particularly weldability and the cause and prevention of cracking in alloy steels.

QUALIFICATIONS: Honours degree in Metallurgy with several years' research experience in physical metallurgy. The ability to lead a small research team working on several diverse problems is essential.

Note: Applicants who do not have the necessary experience may initially be employed as Higher Scientific Officer (£2005-£2265) and at a later date may be advanced to Senior Scientific Officer subject to satisfactory progress.

CONDITIONS: Under specified conditions, first class air/sea transport for the successful applicant and dependents (wife and dependent children) will be provided by the Commonwealth.

Alternatively consideration may be given to a three (3) or five (5) year contract of employment in Australia if desired by the successful candidate. In this case the Commonwealth will bear the cost of return fares, together with the cost of removing the successful applicant's furniture and effects up to a maximum cost of £500 (Aust.), £250 each way.

APPLICATIONS: Forms available from the Senior Representative (AV. 86/6), Department of Supply, Australia House, Strand, London, W.C.2, with whom completed applications should be lodged as soon as possible.

AEI RESEARCH LABORATORY, RUGBY

Metallurgists are required to work on the following problems:

- (a) To study in a fundamental manner recrystallization phenomena in tungsten and its alloys.
- (b) Fundamental research on cemented carbide systems and in particular the relationship between structure and bulk properties.
- (c) To study the properties and to assist in the development of new magnesium and zirconium alloys for use in nuclear reactors.

Applicants for these posts should have a good honours degree in metallurgy and for posts (a) and (b) from two to four years' research experience.

Applications giving full particulars of education, qualifications, age, and experience should be sent to the Director of Research, Associated Electrical Industries (Rugby), Ltd., Rugby, quoting reference M.30.

BRADFORD INSTITUTE OF TECHNOLOGY

Department of Chemical Technology

Applications are invited for the posts of Senior Technician and Technician in the Department of Chemical Technology.

Senior Technician for Dyeing and Finishing, with experience in production.

One Technician for the laboratory workshop, with experience in either electronics or scientific instrument repair.

Two Technicians for the Metallurgy Section. Applicants should have experience in either Physical Metallurgy or Metallurgical Analysis and preferably have a knowledge of workshop practice.

Salary scale, Senior Technician £685-825, Technician £555-£685. Commencing salary according to qualifications and experience.

Further particulars and forms of application may be obtained from the Registrar, Bradford Institute of Technology, Bradford, 7.

HENRY PATTEN

Clerk to the Governors

McMASTER UNIVERSITY

Hamilton, Ontario, Canada

Department of Metallurgy and Metallurgical Engineering

Steel Company of Canada Chair of Metallurgy

McMaster University invites applications for appointment to the Steel Company of Canada Chair of Metallurgy. Considerable research experience is required, and interest in the physical chemistry of iron and steel making is highly desirable. The successful applicant will also hold a senior academic appointment, Associate Professor or Professor, and will be expected to do some teaching at the undergraduate as well as at the graduate level. Salary open.

The metallurgical laboratories occupy about 18,000 sq. ft. of floor space in the one-year-old engineering building. About one-half of this laboratory space is devoted to research. Equipment available for research uses includes a 30-lb. vacuum melting and casting furnace, X-ray diffraction and fluorescent analysis equipment, physical testing machines, a liquid-helium cryostat, a one-megawatt nuclear reactor, and a Bendix G-15 electronic computer, as well as almost all of the usual appurtenances associated with scientific and engineering research in metallurgy.

Postgraduate Scholarships

Applications are invited for Postgraduate Scholarships. Candidates must be qualified to register in courses leading to the M.Sc., M.Eng., or Ph.D. degrees. These scholarships may be supplemented by Departmental Assistantships requiring from four to twelve hours' service per week during the seven-month academic year to provide a yearly income (less fees) of \$2200 to \$2800.

A few Postdoctorate Fellowships are also available.

Graduate Calendars and application forms for graduate study may be obtained from the Secretary of the Faculty of Graduate Studies. Further information may be obtained from Professor H. E. Petch.

APPOINTMENTS VACANT

HOT METALLOGRAPHY

METALLOGRAPHERS are urgently required by the UNITED KINGDOM ATOMIC ENERGY AUTHORITY at the Windscale Laboratories, Sellafield, Seascle, Cumberland for investigations into metallurgical problems arising from the behaviour of fuel elements under irradiation. The work will in the first instance be concerned mainly with the metallographic examination of irradiated uranium and magnesium alloys, and later with similar investigations on beryllium, stainless steel, and uranium oxide. Elaborate new facilities for this purpose are now nearing completion. Instruction will be given in the handling of radioactive materials.

Candidates should preferably have a Pass Degree or H.N.C. or L.I.M.

and experience of metallurgical work including Metallography, but posts may be available for young people without this experience who have the normal qualifications or G.C.E. or equivalent in at least five subjects, two of which must be at the Advanced level in Science or Mathematics.

Salaries will be assessed on the following scales:—£1,110 to £1,360 or £475 (at age 18) to £815 (at age 26 or over) rising to £1,005, according to qualifications and experience.

Housing Assistance Schemes. Contributory Superannuation.

Send postcard for application form quoting reference 439/J.102 to:

The Appointments Officer,
U.K.A.E.A.,
Development and Engineering
Group Headquarters,
Risley, Warrington, Lancashire.

Closing Date: 13 February 1961

COMMONWEALTH OF AUSTRALIA



Defence Standards Laboratories

PHYSICAL METALLURGY

The Department of Supply invite applications for the following vacant position at the Defence Standards Laboratories, SYDNEY:—

HIGHER SCIENTIFIC OFFICER

SALARY: £2005—£2265 (Australian currency).

DUTIES: Carry out research in the field of physical metallurgy with particular emphasis on a study of the structural changes occurring at metal surfaces during abrasion and polishing. The occupant is also expected to carry out some short-term investigations on the processing of metals and their behaviour in service.

QUALIFICATIONS: Honours Degree in Metallurgy. For appointment at H.S.O. level some relevant experience is required.

Note: Applicants who do not have the necessary experience may initially be employed as Scientific Officer, Grade 1 (£1510—£1895) and at a later date may be advanced to Higher Scientific Officer.

CONDITIONS: Under specified conditions, first class air/sea transport for the successful candidate and dependents (wife and dependent children) will be provided by the Commonwealth.

Alternatively consideration may be given to a three (3) or five (5) year contract of employment in Australia if desired by the successful candidate. In this case the Commonwealth will bear the cost of return fares, together with the cost of removing the successful applicant's furniture and effects up to a maximum cost of £500 (Aust.), £250 each way.

APPLICATIONS: Forms obtainable from the Senior Representative (AV. 92/6), Department of Supply, Australia House, Strand, London, W.C.2, with whom completed applications should be lodged as soon as possible.

● PHYSICISTS ● METALLURGISTS ● GENERAL SCIENCE GRADUATES

We invite applications from Graduates to fill several vacancies in our Materials Department. These posts offer varied and interesting work in a wide range of subjects including:—

- (i) The improvement of the oxidation resistance of graphite.
- (ii) Application of Plasma Jets.
- (iii) Thermal Shock Resistance of Materials.
- (iv) Research and Development on Special Ceramics.

Please apply in writing in the first instance to:

Personnel Department,
Hawker Siddeley Nuclear Power Co. Ltd.,
Sutton Lane, Langley, Bucks.

ALUMINIUM LABORATORIES LIMITED

(The Research and Technical Organization of the international ALCAN Group of Companies)

X-RAY DIFFRACTION ELECTRON PROBE MICROANALYSIS

PHYSICISTS or METALLURGISTS with experience in either of these fields required for a group engaged in basic and applied research into the properties of aluminium alloys. Write to the Personnel Officer, Aluminium Laboratories Ltd., Southam Road, BANBURY, Oxon.

ALCAN INDUSTRIES LIMITED

require a



WORKS METALLURGIST

at their Rogerstone, nr. Newport, Mon., factory for the Plant Control Department. Age 25 to 30. University degree or equivalent qualification essential. Experience with aluminium an advantage. Write for an application form to Personnel Officer, Alcan Industries Limited, Bush House, Aldwych, London W.C.2.

*A member of the Aluminium Ltd.,
of Canada group of Companies*